In Reply Refer to 6840-P

Diana Hwang
Level 1 Biologist
U. S. Fish and Wildlife Service
2600 SE 98th Ave. Suite 100
Portland, OR 97266

Subject: Biological Assessment (BA) for bull trout for 2001 proposed road maintenance activities on the Prineville District, Bureau of Land Management (BLM) in the North Fork John Day River subbasin.

Dear Diana:

Enclosed is the Draft BA for bull trout for 2001 proposed road maintenance on the Prineville District, Bureau of Land Management (BLM) in the North Fork John Day River subbasin.

Assessment of Environmental Baseline and Effects of the Action were determined using information from 1995 water quality monitoring studies, ocular riparian assessments, 1996 riparian photo point surveys, 1998 compliance monitoring work, and professional judgement.

If you have any further questions or need of additional information/ clarification, please contact Brent Ralston, fisheries biologist, at (541) 416-6713, or myself at (541) 416-6731. We would appreciate a letter of concurrence from the U.S. Fish and Wildlife Service at your convenience.

Sincerely,

Christina Welch
Field Manager, Central Oregon R.A.

Enclosures: Biological Assessment

Draft
Biological Assessment for Bull Trout and its Habitat in the North Fork John Day River Subbasin

Bureau of Land Management
2001 Proposed Road Maintenance Activities Prineville District

July 2001

Draft Biological Assessment (BA) for bull trout for 2001 Proposed Road Maintenance Activities on the Prineville District, Bureau of Land Management (BLM) in the North Fork John Day subbasin.

Introduction

Within the North Fork John Day River (NFJDR) subbasin, the BLM Prineville District manages about 8,640 acres of scattered and moderately blocked public lands which drain into, or encompass bull trout migratory habitat (winter).

The BLM is requesting consultation on a road maintenance action. This action is consistent with our governing programmatic plans. As a result of the recent completion of much of the North east Oregon Assembled Land Exchange, the BLM has acquired numerous acres containing several miles of road along the North Fork John Day River.

The bull trout analysis area for this BA includes all lands draining into the NFJDR from the mouth of Potamus Creek (RM 38.5) to the Prineville BLM District boundary at the Grant/Umatilla County line (RM 51.5). Within the analysis area, bull trout only occupy habitat in the NFJDR proper. For analysis purposes, assessment of the baseline pathways were determined from informal field observations of primarily BLM lands, and to a lesser degree, previously private lands along the North Fork John Day River and tributaries, excluding the uplands on National Forest lands. The BLM lands are scattered within six 5th field Hydrologic Units (#17070202-02,04,06,07,08, and 09).

Salmonid habitat has decreased in both quantity and quality in the analysis area in recent history due to increased human activities and some natural events. Land uses such as timber harvesting, road construction, livestock grazing, placer mining, agriculture practices (irrigation water diversions, and encroachment on riparian zones), and stream channelization have impacted salmonid habitat in the river. Natural events such as insect infestations and epidemics, large catastrophic forest fires, and basin wide and localized flooding have further contributed to the degradation of riparian and instream habitats. It is difficult to estimate how land management practices may have exacerbated the severity and intensity of natural events impacting riparian habitat conditions.

Improperly managed livestock grazing, timber harvesting, and road building activities have impacted fish habitat by damaging or suppressing riparian vegetation, impacting water quality, reducing habitat complexity, and destabilizing streambanks and watersheds (John Day River Subbasin Report, 1990). Irrigated agriculture activities are insignificant within the analysis area, with range and forestry being the principle land uses. According to the Oregon Water Resources Department (OWRD, 1986), land uses in the last 125 years may have had a significant impact on the John Day basin's capacity to retain water and release it later in the season.

Logging practices throughout the John Day Basin have degraded water quality in streams and caused both direct and indirect impacts to fish and aquatic resources. The following is a list of fishery related impacts that have resulted from logging activities (John Day River Subbasin Report, 1990).

1. Impaired water quality from increased sedimentation and water temperatures, and lowered dissolved oxygen levels.

2. Direct stream habitat losses resulting from instream channel changes and loss or lack of large woody materials.

3. Removal of riparian vegetation canopy resulting in reduction of instream food production and increased stream temperatures.

Timber harvesting within riparian zones on previously private lands has been more extensive than on the BLM managed lands. Forested BLM tracts in the analysis area have had limited timber management activities and still contain a good mix of large overstory trees.

From RM 51.3 to RM 38.5 (mouth of Potamus Creek), the river canyon has moderate to patchy stands of ponderosa pine and Douglas fir. Canyon slopes on the south side of the river (north facing) contain the most dense timber stands. Hawthorne, elderberry, coyote willow, black cottonwood, Rocky Mountain maple, ninebark, snowberry, and western juniper are understory shrubs and trees found scattered and clumped in riparian zones. Exotic weeds are also scattered along the river, particularly in disturbed areas (old slash burn piles, and areas where livestock grazing has been concentrated too heavily. Cobble/gravel bars and bedrock substrate areas are common in the NFJDR floodplain.

Potential riparian communities in the North Fork drainage are largely determined by topography, elevation, and aspect. Riparian habitats with shady northerly and easterly aspects, which are less prone to drying, are more densely vegetated with greater species diversity of shrubs and sedges. These habitats exhibit high potential for rapid recovery from disturbance.

A 1995 Properly Functioning Condition (PFC) assessment of BLM riparian/stream habitats identified the North Fork John Day River, and Graves, Mallory, and Potaumus Creeks as Functioning-at-Risk (FR). The acquisition tributaries are also estimated to be Functioning-at-Risk.

The lower NFJDR is known to carry significant ice flows during most winters. These hydrological events contributes to degraded riparian zones and streambank instability (OWRD, 1986). Land use practices and watershed conditions may lead to ice scouring. Ice flow scars are commonly seen on pine trees adjacent to the river.

Mining historically was an important economic activity in the NFJDR subbasin. Gold continues to be mined from placer and small bedrock mines in the upper NFJDR. Exploration activities continue mainly on previously known gold and silver deposits on Granite Creek and the headwaters of the NFJDR (OWRD, 1986). Mining activities and disturbances were primarily upstream of the analysis area.

Bull Trout Subpopulation Characteristics/Species Distribution
According to Buchanan (1997), and ODFW biologists, migrating bull trout use the NFJDR in the analysis area down to the mouth of Wall Creek (RM 22.5) and recent

ODFW surveys indicate this may extend downstream to Spray, during winter season when water temperatures are suitable. Bull trout "occupied" habitat includes spawning, rearing, or resident adult, and migratory winter habitat. BLM managed lands within six grazing allotments are adjacent to bull trout winter migratory habitat. The North Fork John Day River currently supports spawning and rearing habitat upstream of the analysis area in Clear, Crane, Desolation, S. Fk. Desolation, Big, Baldy, S. Fk. Trail and Winom Creeks, and in the N. Fork John Day above Gutridge. Historic habitat included Granite Creek, N. Fk. Desolation Creek and Meadow Brook Creek. The upper North Fork contains the most bull trout habitat in the John Day Basin (Claire and Gray, 1993).

Water Quality
The NFJDR subbasin has the best chemical, physical, and biological water quality in the John Day basin. Water quality problems do occur in localized areas. Water quality is adequate for most beneficial uses. Elevated water temperatures and sedimentation do impair uses by cold water fishes however. Elevated water temperatures occur during low flows and sedimentation and erosion occur during high flows. Tributaries of the NFJDR have better shading and denser tree and shrub components than the main river. In 1995, water quality data was collected at RM 45 on the NFJDR. The 7-day average maximum daily temperatures for the site was 26.9 C at RM 45 starting the week of July 23.

Habitat Access
There are no known physical barriers to bull trout migration in the mainstem NFJDR.

Habitat Elements
No quantitative data has been collected on substrate embeddedness in the area. Rough estimates from a 1996 riparian photo point survey indicate that embeddedness is within 20-30%. Large instream wood is rare in the NFJDR, and throughout the analysis area. Pool frequencies and quality in the NFJDR are likely functioning appropriately, but tributaries have considerably lower pool frequencies than desired. Pools in the NFJDR generally are large and deep (>1 meter), but tributaries have few large and deep pools. The NFJDR has some off channel habitat areas and limited amounts of habitat refugia.

Channel Condition/Dynamics
No data is available on Wetted Width/Maximum Depth Ratios for the NFJDR or its tributaries. Based on informal observations, streambank conditions generally have 90 percent stability over 50-80 percent of any stream reach (Functioning at Risk). Streambank stability is primarily provided from rock, grasses, scattered deciduous shrubs and trees and pine trees. Off channel areas are probably frequently hydrologically linked to main channels in the NFJDR, based on informal observations.

Flow/Hydrology
The NFJDR is the most important subbasin in terms of water quality and flow contribution to the John Day River, contributing over 60 percent of the annual average

discharge of the basin. Some tributaries in the analysis area (Stony) are known to experience interrupted surface flows during dry years. Problems of the North Fork subbasin are high volumes of runoff, low summer streamflows, and localized degraded water quality. Seasonal streamflows are unevenly distributed throughout the year Some erosion and sedimentation problems occur in localized areas. Periodic high flows carry sediment and increase turbidity, affecting water quality and fish habitat (OWRD, 1986).

Historic and current land use activities have altered the analysis area drainage. Mining, specifically dredging, has modified stream channels and riparian vegetation upstream of the analysis area. Timber harvest, road construction and livestock grazing may contribute to the uneven distribution of subbasin discharge (OWRD, 1986). Low to moderate increases in active channel length have probably occurred in the area due to human caused disturbances, but availability of data to substantiate this is unknown.

Watershed Conditions

There are many valley bottom roads, but road densities range from 1-2.4 miles/mi^2. All roads are either gravel or native material surfaced. Most of this analysis area is non-forested, but riparian areas have had timber harvesting that has impacted habitat conditions. Forested areas are concentrated upstream of Potamus Creek on the south canyon slopes of the NFJDR, and have been harvested moderately. Most forested BLM tracts have not had any significant timber harvest. It is estimated that riparian conservation areas (RHCA's) have experienced moderate to high losses of connectivity or function. Presently the riparian vegetation component along the NFJDR probably does not contribute largely to stream function. Conditions of RHCA's on tributary habitats is generally better however. BLM parcels on the NFJDR and tributaries generally have a well intact overstory component of conifers, and varying conditions of understory shrub and tree species. Riparian areas are estimated to be >50% in similarity to natural community composition. Because the area is arid, resiliency of habitat to recover from environmental disturbances is moderate to low. Most scour events are localized.

Integration of Species and Habitat Conditions

Bull trout spawning habitats in the NFJDR drainage (upstream of the analysis area) are concentrated in the upper tributaries and Desolation Creek. According to ODFW these populations are at "Moderate Risk" of extinction. Cumulative disruption of habitat from mining, timber harvesting, road building, and grazing, past opportunities for sport fishing overharvest, poaching, and hybridization and competition with brook trout has resulted in a declining trend in the subpopulation size. Winter migratory habitat connects these spawning stream reaches and connectivity is likely during spawning season.

Road Conditions

The BLM acquired several miles of existing road within the analysis area. The primary road is located adjacent to the North Fork and runs parallel to the stream for approximately 22 miles. This roads provides the only guaranteed access to much of the area through an easement purchased by ODFW from Louisiana-Pacific Corporation in 1976. The original easement provided for public use of the existing road from the mouth of Camas Creek downstream to the mouth of Potamus Creek. Road maintenance has not occurred along the road due to concerns from adjacent private landowners that maintenance would encourage more public use. The road is in a state of disrepair. Use occurs on the road throughout the year but peaks during the recreation times of summer and fall (associated with fishing, hunting and rafting seasons). The road itself is a significant source of sediment to the stream. Lack of adequate maintenance in recent years has exacerbated the problem. High runoff and overland flow in the spring and late summer lead to erosion of surface material from the road area. Uneven surfaces (i.e. ruts and gullys) in the road also contribute to the erosion occurring.

Description of Ratings of Baseline Indicators for the North Fork John Day River

Water Temperature: This segment of the North Fork John Day River (NFJDR) is considered Winter Migratory Habitat only for bull trout. Data reveals that this segment has not meet State of Oregon criteria of 64 degrees F. This standard has been exceeded each year between 1986-95 at the river mouth. **Not Properly Functioning**

Sediment/Turbidity: There is no sediment data available for the NFJDR. Based on direct observation, turbidity is low to moderate. Professional judgement would rate condition as **At Risk**.

Chemical Contamination/Nutrients: No CWA 303d listed reaches. Upstream agriculture influences is minor. **Properly Functioning**

Physical Barriers: There are no human-made barriers on the NFJDR. **Properly Functioning**

Substrate Embeddedness: There is no substrate embeddedness data available for the NFJDR. Professional judgement based on 1996 Riparian Photopoint studies would estimate cobble embeddedness between 20-30 percent. **At Risk**

Large Wood: There is no large wood data available for the NFJDR. Professional judgement would put it in the **Not Properly Functioning** category. This is due to the lack of instream wood observed.

Pool Frequency: There is no current pool frequency data available for the NFJDR. Professional judgement would rate it **Not Properly Functioning**. This is based on infrequent number of pools seen from direct observations.

Pool Quality: Based on direct observations, pools in the NFJDR generally are large and deep (>1 meter), but have moderate reductions of pool volume by fine sediment. Professional judgement would rate condition as **At Risk**.

Off-channel Habitat: Based on general lack of backwater areas observed, this category condition is **Not Properly Functioning**. Past management activities which damaged streambank stability and high flow events likely altered most natural off-channel habitats.

Refugia: Adequate habitat refugia does not exist on the NFJDR. With the current fragmented BLM ownership pattern on the river, even the most proactive restoration efforts are not going to supersede actions from many more private miles on the river. Riparian areas are not sufficient to buffer instream habitats from upstream actions that degrade habitat quality. These refugia are not of sufficient size, number and connectivity to maintain viable populations or sub-populations. **Not Properly Functioning**

Wetted Width/Max Depth Ratio: There is no current wetted width/max depth ratio data available for the NFJDR. Professional judgement would put it in the **Not Properly Functioning** category. This is based on direct observations and review of old stream survey data.

Streambank Condition: There is no current streambank condition data available for the NFJDR. Professional judgement from direct observation and review of 1996 photopoint studies would put it in the **At Risk** category. Bare cobble bars are common along the river, but fairly stable.

Floodplain Connectivity: Little historic data exists showing the extent of wetlands and the frequency of overbank flows to compare to current conditions. Professional judgement from direct observation and review of 1996 photopoint studies would put it in the **At Risk** category. Floodplains are likely seasonally inundated, but riparian vegetation is inadequate to capture/store waters long enough to develop wetland habitats.

Changes in Peak Flow/Base Flow: There is little to no flow data available for the NFJDR. Professional judgement would put it in the **Not Properly Functioning** category. This is due to the reduction of perennial grasses that has probably limited the ability of these watersheds to dissipate energy. The NFJDR above Monument has historically had heavy grazing use on the private lands. Until the early 1990s, grazing on the BLM lands was season long also. This can significantly increase the peak flows on these systems.

Drainage Network Increase: Increases of the drainage network are generally limited to road interaction with streams. Several river fords to access hillslope roads exist. Professional judgement would estimate condition as **At Risk**

Road Density and Location: Estimated average road densities for all BLM lands are 2-3 mi/mi^2, with one road following the NFJDR. Generally this road is outside of the riparian zone, and has little effect on the river. **At Risk**

Disturbance History: BLM forested tracts along the NFJDR have not had any significant timber harvest, so disturbance history (% ECA) is less than 15%. **Properly Functioning**

Riparian Reserves: To be able to answer this question an assessment of the potential of the different riparian sites would have to be made. At this time no such assessment has occurred on

the public lands on these streams. **Not Applicable**

Project Descriptions

Road Maintenance Activities

The major action being addressed by this BA is a short period of initial road maintenance activities along the North Fork Access Road. These activities would be confined temporally and spatially to a one time application in the year 2001 or thereafter and include only the main access road. The purpose is to provide much needed maintenance along a poorly maintained and degraded road in an environmentally important watershed. Several listed fish species occur within the drainage - steelhead trout and bull trout. Steelhead are year-round residents in at least some life history stage while bull trout are strictly winter migrants during the colder times of year.

The road would be graded using heavy equipment such as a grader. Minimal spot rock application in severely washed out areas would occur using on site materials (these sites are few - approximately 5-10). The entire length of road to be graded includes approximately 22 miles.

The project will improve road hydrologic conditions by eliminating ruts and gullies associated with overland flow across the road thereby reducing sediment input to the river. This action is a temporary measure to minimize road impacts to drainage and water quality and until a more comprehensive transportation management plan can be designed in association with a broadeer land management plan associated with the entire area.

Description and Distribution of Species

Inventories and Surveys

Until recently little specific information on the status or biology of bull trout in Oregon was available. During the past decade there has been a concerted effort to find out more about the bull trout. Since 1990, ODFW, Forest Service (FS), and BLM stream survey crews have been documenting bull trout distribution and relative abundance. Bull trout distributions discussed in this analysis are referenced from the latest information from ODFW, BLM, and Forest Service fisheries biologists.

Life History of Bull Trout

Bull trout typically have more specific habitat requirements than other salmonids. Because of their specific requirements, bull trout are more sensitive to changes in habitat and less able to persist and thrive when habitat conditions are altered or

degraded (Rothschild and DiNardo, 1987). Channel and hydrologic stability, substrate, cover, temperature, and the presence of migration corridors consistently appear to influence bull trout distribution or abundance (Ziller, 1992).
Adults usually spawn from August through November in the coldest headwater tributaries of a river system, and require water temperatures <10C for spawning, incubation, and rearing (Weaver and White 1985). Although migratory bull trout (fluvial or adfluvial) may use much of a river basin through their life cycle, rearing and resident fish often live only in smaller watersheds or their tributaries (second-fourth order streams) (Ziller, 1992).

Juvenile bull trout closely associate with stream channel substrates, often using interstitial spaces for cover (Fraley and Shepard 1989). A close association with channel substrates appears more important for bull trout than for other species. This specific rearing habitat requirement suggests that highly variable stream flows, bed movements, and channel instability will influence the survival of young bull trout, especially since embryos and alevins incubate in substrate during winter and spring (Rieman and McIntyre 1993).

Increases in fine sediments to streams can reduce pool depths, alter substrate composition, reduce interstitial space, and cause channels to braid. These changes degrade fish habitat and reduce rearing bull trout survival and abundance (Reiman and McIntyre 1993). Bull trout usually associate with complex forms of cover and with pools. Juveniles live close to instream wood, substrate, or undercut banks and in pocket pools formed by boulders. Young-of-the-year fish use side channels, stream margins, and other low velocity areas. Older and larger fish use pools and areas with large or complex instream wood and undercut banks (Reiman and McIntyre 1993). Instream wood correlated significantly with bull trout densities in streams sampled in the Bitteroot National Forest (Reiman and McIntyre 1993).

Migratory corridors connect safe wintering areas to summering or foraging areas. Movement is important to the persistence and interactions of local populations within the metapopulation. Open corridors among populations are required to ensure gene flow, refounding of locally extinct populations, and enhancement of locally weak populations. Migratory populations of fish are likely to stray more between streams than resident populations, increasing the potential for such dispersal (Reiman and McIntyre 1993).

Water temperature is the most critical factor that influences bull trout distributions, but critical thresholds however, are poorly defined. Water temperatures in excess of 15C are thought to limit bull trout distribution (Fraley and Shepard 1989). It is not known whether the influence of water temperature is consistent throughout the life cycle or whether a particular stage is especially sensitive. Increasing water temperatures increase the risks of habitat invasion by other species that may displace bull trout.

Bull trout have very low levels of variation within populations (John Day, Umatilla, Grande Ronde Basins, etc) but are highly differentiated between populations (Spruell and Allendorf 1997). The John Day and Grande Ronde bull trout populations tend to be similar genetically, however a unique allele frequency was found in seven of ten John Day populations which was not present in any of the 11 Grande Ronde populations (Spruell and Allendorf 1997).

Bull trout are indigenous to the John Day River Basin and historically had a wider distribution within the Basin than at present. Modern land-use practices in the John Day Basin have altered aquatic habitats where salmonid fishes live, including the bull trout. The current distribution of bull trout is clearly fragmented (Howell and Buchanan 1992). Bull trout in the John Day Basin are considered as one metapopulation, even though the sub-populations within the main stem, North and Middle Fork subbasins probably have no genetic interchange presently (Unterwegner, personal comm. 1997).

Presently bull trout spawning and rearing habitat in the North John Day Basin includes Clear, Crane, Desolation, S. Fork Desolation, Big, Baldy, Trail, Crayfish, Cunningham, Onion, and Boulder Creeks and the NFJDR above Gutridge

Migratory bull trout habitat in the NFJDR extends down the river to the mouth of Wall Creek (RM 22.5), and also includes lower Desolation Creek.

Bull trout distributions within the Basin have been affected by an array of human caused factors. These factors are the primary reasons for the decline of local populations (Claire and Gray, 1993; Ratliffe and Howell, 1992).

Habitat Degradation

-Water temperature impacts (elevated temperatures).
-Riparian habitat loss
-Loss of instream structure and complexity
-Loss of instream large wood and potential future large wood
-Increased sediment delivery to bull trout habitats
-Food supply (reduction in anadromous fish populations)

Passage Barriers

-Natural barriers. Falls on S. Fork Desolation, E. Meadowbrook, and Big Creeks

Overharvest/Poaching

-Bull trout are aggressive by nature and readily take lures or bait, making them very susceptible to angling. Legal harvest has been higher in the North Fork drainage than the Middle Fork or Upper Mainstem. In 1993 ODFW prohibited angling harvest of bull trout in the John Day Basin.

Hybridization and Competition

-Brook x bull trout hybrids have been found in S. Fork Desolation and Crane Creeks. Other streams containing brook and bull trout, with potential for hybridization, are Desolation, Baldy, Big and Winom Creeks, and the upper NFJDR..

Climate Change

-Oregon is near the southern fringe of bull trout distribution. Only an isolated population ir reductions of bull trout in the southern edges of its range has been caused at least in part by the loss of cold water habitat following the retreat of glaciers and snowfields since the late Pleistocene (Cavender 1978). This situation has been aggravated by human-caused habitat alterations.

Analysis of Potential Effects of the Proposed Actions

Road Maintenance Activities
This one-time application of road maintenance to this road will occur in mid-July to early August for a time span of approximately 5 days. A total of 22 miles will be graded from Camas Creek to Potamus Creek. The road in its current condition is a source for sediment entering the North Fork. Numerous washes, gullies and ruts the entire length of the road when associated with overland flow events such as snowmelt move large amounts of sediment into the North Fork. The road maintenance activities described will not add any more sediment to the river environment. The intent of the maintenance is to improve the hydrologic character and drainage characteristics of the road. This will reduce the amount of sediment entering the stream environment from the road in the future until such a time as a comprehensive transportation plan is developed for this area and impacts of those actions addressed.

The time frame for action occurs well outside of bull trout presence within the North Fork John Day River area administered by the BLM. Bull trout only occur in this section when water temperatures drop to acceptable limits for bull trout to migrate through this area in the wintertime. The amount of sedimentation actually caused by the road maintenance activities will be imperceptible in comparison to the amount of sediment already caused by erosion of the road in its present condition. Improved condition of the road will actually reduce the amount of sediment runoff occurring from the road in the spring of 2002.

Potential Effects to Each Habitat Pathway/Indicator

Road Maintenance

BLM will perform on-time maintenance on this road, primarly involving blading and site specific spot rocking. The road is a native surface. Road shoulders have varying degrees of vegetative cover.

Road maintenance of this road is crucial to prevent large amounts of sediment from entering the river.

Rational for Checklist Ratings of Effects for population and Environmental Indicators (See Table 1) for Road Maintenance.

Water Temperature: Maintenance of this road will not affect water temperatures in the area.

Sediment/Turbidity: The use of non-maintained soil/gravel roads causes chronic sources of fine sediment to be potentially mobilized and delivered to stream channels. Vegetation along these road shoulders is instrumental in catching and stabilizing sediment runoff of the road surfaces. Where little vegetation or space exists between the road and the stream, this impact is more significant. Maintenance of this road will reduce the amount of sediment entering the stream.

Chemical Contamination/Turbidity: Road maintenance should not affect water chemistry.

Physical Barriers: Road maintenance will not cause migration barriers.

Substrate Embeddedness: Potentially, additional sediments loosened, mobilized, and delivered to the streams could increase interstitial substrate fines, due to road maintenance. This would be masked by the level of sediment already entering the stream as a result of poor hydrologic and drainage characteristics of the road in its current condition.

Large Wood: Maintenance of these roads does prevent woody vegetation from establishing in areas where roads are encroached into the riparian zone. These areas generally occur in narrow area where insufficient room was available for road placement outside of the floodplain area.

Pool Frequency: Road maintenance will not change pool frequency or flow regimes significantly enough to alter pool formation.

Pool Quality: Chronic sediment input could degrade pool habitat quality by filling them partially with mud and fines. Maintenance of this road will reduce the amount of sediment entering the stream as a result of poor hydrologic and drainage characteristics associated with the current condition of the road.

Off-Channel Habitat: There should be no effects to off channel habitat due to road maintenance.

Refugia: Road maintenance will not is not likely to further degrade their suitability beyond current conditions.

Wetted Width/Max Depth Ratio: Road maintenance is not expected to effect the wetted width/max depth ratio.

Streambank Condition: No significant bank damage is anticipated to occur due to the road maintenance. This component should not have a significant affect to bull trout habitat.

Floodplain Connectivity: Road maintenance will not significantly affect floodplain function and connection to the stream during flood events beyond the impact of the road physically occupying segments of active floodplains. Wetland areas and riparian vegetation will be maintained.

Changes in Peak/Base Flow: Road maintenance will not change the flow regime.

Drainage Network Increase: Road maintenance will not increase the drainage network.

Road Density and Location: Road densities will not change with road maintenance.

Disturbance History: Disturbance history will not be affected by road maintenance.

Riparian Reserves: As described in the environmental baseline section, no assessment of riparian potential has occurred. However, road maintenance should not significantly effect the riparian areas.

Table3. Showing the checklist for documenting environmental base line and effects of **road maintenance** on relevant indicators.

PATHWAYS: **INDICATORS**	**ENVIRONMENTAL BASELINE**			**EFFECTS OF THE ACTION(S)**		
	Properly Functioning	**At Risk**	**Not Properly Functioning**	**Restore**	**Maintain**	**Degrade**
Water Quality: Temperature			X		X	
Sediment		X			X+	
Chem. Contam./Nut.		X			X	
Habitat Access: Physical Barriers	X				X	
Habitat Elements: Substrate		X			X+	
Large Woody Debris			X		X	
Pool Frequency			X		X	
Pool Quality		X			X	
Off-Channel Habitat		X			X	
Refugia			X		X	
Channel Cond. & Dyn: Width/Depth Ratio			X		X	
Streambank Cond.		X			X	
Floodplain Connectivity		X			X	
Flow/Hydrology: Peak/Base Flows		X			X	
Drainage Network Increase		X			X	
Watershed Conditions: Road Dens. & Loc.		X			X	
Disturbance History	X			N/A		
Riparian Reserves	N/A			N/A		

Determination of Effects: Dichotomous Key for Making ESA Determination of Effects

1. Are there any proposed/listed fish species and/or proposed/designated critical habitat in the watershed or downstream from the watershed?

   YES.....Go To 2

2. Will the proposed action(s) have any effect whatsoever on the species and/or critical habitat?

   YES.....Go To 3

3. Will the proposed action(s) have the potential to hinder attainment of relevant "functi

   NO.....Go To 4

4. Does the proposed action(s) have the potential to result in "take" of any proposed/listed fish species or destruction/adverse modification of proposed/designated critical habitat?.

   A. There is a neglegible (extremely low) probability of take of proposed/listed fish species or destruction/adverse modification of proposed/designated critical habitat.
   .....**Not Likely to Adversely Affect**

References Cited

Armour, C. L. 1977. Effects of deteriorated range streams on trout. U. S. Bureau of Land Management, Boise, Idaho.

Behnke, R. J., and M. Zarn. 1976. Biology and management of threatened and endangered western trouts. U. S. Forest Service General Technical Report RM-28.

Buchanan, D. V., M. L. Hanson, and R. M. Hooten. 1997. Status of Oregons Bull Trout. Oregon Department of Fish and Wildlife. Portland.

Cavender, T M. 1978. Taxomony and distribution of the bull trout, *Salvelinus confluentus* (Suckley) from the American Northwest. California Fish and Game. 3: 139-174.

Claire, E. W. and M. E. Gray. 1993. Bull Trout of the John Day Basin. Oregon Department of Fish and Wildlife, Northeast Region, John Day Fish District.

Clark, R. N. and D. R. Gibbons. 1991. Recreation. *In:* Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society Special Publication. 19: 459-481. 1991.

Fraley, J. J., and B. B. Shepard. 1989. Life history, ecology, and population status of migrat

Howell, P. J., and D. B. Buchanan. 1992. Eds., Proceedings of the Gearhart Mountain bull trout workshop; Gearhart Mountain, Oregon. Corvallis, Oregon. Oregon Chapter of the American Fisheries Society. 67 pp.

Oregon Water Resouces Department. 1986. John Day Basin Report.

John Day River Subbasin Salmon and Steelhead Production Plan. 1990. Oregon Department of Fish and Wildlife, Confederated Tribes of the Umatilla and Warm Springs Indian Reservations.

McPhail, J. D. and C. C. Lindsey. 1986. Zoogeography of the freshwater fishes of Cascadia (the Columbia system and rivers north of Stikine). Pages 615-638 *in* C. H. Hocult and E. O. Wiley, eds. The zoogeography of North American freshwater fishes. New York.

Platts, W. S. 1991. Livestock Grazing. *In:* Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society Special Publication. 19: 389-423. 1991.

Reiman, B. E., and J. D. McIntyre. 1993. Demographic and habitat requirements for conserv

Rothschild, B. J., and G. T. DiNardo. 1987. Comparison of recruitment variability and life history data among marine and anadromous fishes. American Fisheries Society Symposium 1: 531-546.

Spruel, P., and F. W. Allendorf. 1997. Nuclear DNA analysis of Oregon bull trout. Final Report #97/5 to the Oregon Department of Fish and Wildlife. University of Montana, Missoula.

Unterwegner, T. 1997. Personal communication. John Day District Fisheries Biologist, Oregon Department of Fish and Wildlife.

Weaver, T. M., and R. G. White. 1985. Coal Creek fisheries monitoring study No. 3. Final Report. Montana Cooperative Fisheries Research Unit, Bozeman.

Ziller, J. S. 1992. Distribution and relative abundance of bull trout in the Sprague River subbasin, Oregon. *In*: Proceedings of the Gearhart Mountain bull trout workshop; Gearhart Mountain, Oregon. Pages 18-29.